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Measuring what matters - broadening official statistics:
Session 2: How to react swiftly

Experimental statistics – a way to cover information gaps

Note by Statistics Poland

Summary

This document discusses a question of official statistics' stance on responding to emerging information needs in the face of growing dynamics and complexity of decision-making processes. The system developed by Statistics Poland stands as an illustration of a possible approach to this challenge. The document points to a number of issues related to official statistics' expansion beyond its traditional scope of operations, and it places it in a larger context of official statistics' role in a contemporary policy process.

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I. Introduction

1. Growing complexity and a shift towards evidence-based decision-making raise a question of official statistics' role in the dynamic processes which require a new approach to statistical data production. For official statistics, in order to remain a core pillar of contemporary decision-making, it appears inevitable to adjust its operations to rapidly changing environments and cross-cutting phenomena. However, responding to a wide range of information needs, stemming from numerous stakeholders, poses a vital issue and potential risks. It is a challenge which needs to be addressed with a comprehensive and systematic approach to ensure both, agility in reacting to increasing and new information needs, and maintaining the highest quality of statistics achieved by adherence to a rigorous methodology.

2. Experimental statistics comes as one of the ways to tackle the issue of filling information gaps. Yet, there are a number of challenges regarding employing experimental research in official statistics itself, as well as with regard to placing experimental statistics in a wider context of statistical data production. First of all, experimental statistics, due to their very nature, may pose a risk of experimental data ineligible interpretation and utilization. Secondly, introduction of experimental research into official statistics requires openness within the official statistics itself, to such aspects, *inter alia*, new approach to survey design, often based on the formulation of a specific problem, which in turn translates into a new methodology, more complex statistical modelling, etc. Finally, if the role of official statistics in evidence-based decision-making processes is to be reconsidered or reaffirmed, experimental statistics become an essential part of a complex system designed to respond to emerging information needs. Developing such a system requires a comprehensive and interactive approach which involves not only the most effective manners to identify and address information gaps, but also organizational and financial arrangements making the response possible.

II. Experimental statistics within the information gaps identification system

A. Design of the information gaps identification system

3. Despite potential risks, broadening the standard scope of official statistics through identification and filling actual information gaps, appears an inevitable step in the official statistics' practice. Statistics Poland has developed a multi-layer system which allows for a constant interaction with users of statistical data, and thus, enables identification of data to be provided in a swift manner. The system has been developed incrementally and is still evolving by incorporating new possibilities to expand research areas, improve existing statistical production, as well as asses the existing modes of covering information needs. It combines interconnected actions based on regular operations of the statistical office which has been in place for many years, with new channels of information deficiency identification.

4. Official statistics in Poland operates based on annual *statistical surveys program of official statistic* approved by the Council of Ministers. Thus, the first layer of the system entails consultations of the *Program* with all major users of statistical data, including local, regional and central government offices and agencies, as well as research institutes, before its submission to the Council's approval. It is a crucial stage which enables recognition of the actual information gaps within 'traditional' statistical surveys, as well as discerning entirely new research needs. To this end, the feedback from numerous stakeholders is

carefully revised in terms of the extension of the surveys already planned, where the production of additional data does not require significant financial resources or organizational burdens, or alternatively, the possibilities to launch new research are considered. Typically, in the latter case, the implementation of a new survey in the *Program* is preceded by the methodological work and pilot testing to assess its feasibility, and it undergoes a rigorous approval process of the Methodological Commission. Concurrently, Statistics Poland's sixteen regional offices play an important role in conveying the message on the information gaps reported by the regional governments.

5. The second layer involves cooperation with the Ministry of Investment and Economic Development. It covers mutual identification of information gaps and developing solutions to handle them, in particular in the area of the EU cohesion policy monitoring. In this realm, information needs recognition is based on a dialogue and analysis of the priority areas to be covered, with the extension of the existing or introduction of new research. The process is fully interactive with Statistics Poland's assessment of the feasibility of the studies proposed by the Ministry, alongside its active role in suggesting potential fields which require statistical research. The feedback from the stakeholders who consult the *statistical surveys program of official statistics* is also channelled and processed at these stages, in order to verify the possibility to fill some of the information needs identified in the *Program's* consultation within the framework of Statistics Poland-Ministry cooperation. It is worth emphasizing that identification of information needs and formulation of new research proposals involves all the Statistics Poland's departments, as well as regional statistical offices. The system of experimental research is managed by the Program Council, acting as a steering committee and a key decision-making body which makes a final approval of the studies to be implemented.

6. The above-depicted system is complemented by additional activities in order to diagnose information gaps in statistical production, carried out in an occasional manner. They involve encouraging individual initiative of Statistics Poland's research teams and departments to identify the research areas which require extension, alteration or improvement. Once identified, financial and organizational aspects of carrying out new studies or data production patterns are verified, including a search for possible, often external source of financing, possible collaborations, etc.

B. Experimental research as part of the system

7. The systematic approach to identification of new information needs, adopted by Statistics Poland has resulted in an execution of a number of experimental research which have been carried out since 2013 within the EU-funded project "Statistics for the cohesion policy". So far the project has involved over 60 studies with a broad thematic scope, such as *inter alia* poverty, social services, functional areas, regional accounts, R&D and innovation. They have enabled the extension of current surveys and creating of new approaches, such as application of new research tools and methods (e.g. GIS, counterfactual methods, SEA), new data sources (administrative data in lieu of questionnaire surveys), new thematic fields (e.g. the emission of gases, research infrastructure),as well as the extension of the information scope in the *development monitoring system STRATEG* – an on-line tool that collects data derived from various sources to monitor the implementation of strategies binding in Poland at the national, supra-national and regional levels, as well as in the European Union (Europe 2020 strategy). Despite the novelty of the above-stated work, implementation of each experimental research into official statistics is a subject of

comprehensive and careful revision, and a number of them have become official statistics' practice.[1]

8. An example of the research which broadened the scope of the Polish official statistics involved identification of special areas within the main cities and their functional areas based on demographic factors and economic status of their inhabitants. The novelty of the research consisted in the methodology, as well as territorial dimension of the subject matter. The research involved the identification of data sources and development of the set of indicators which enabled the analysis of differentiation within the city limits, as well as its surroundings, allowing delineating the areas that stand out in terms of the above-mentioned characteristics. The results of the research proved useful to local authorities in designing effective development programs, taking into account demographic processes, such as ageing, including economic facets of the phenomenon.

9. Another example of experimental research carried out within the information gaps identification system involved poverty rate estimation at the county level (LAU 2) with the use of small area estimation methods. The pioneer approach applied in the research consisted in the application of two groups of statistical methods, i.e. taxonomic analysis and small area estimation, for a comprehensive assessment of the poverty phenomenon, its range and territorial distribution. The comparison of the results obtained with the use of both methods at the county level (LAU 2) enabled independent verification of the poverty indicator at the lower level of territorial aggregation, responding in this manner to the actual information needs. Moreover, the research resulted in recommendations on poverty rate estimation methodology, pointing to further enhancement of small area estimation models, including those that involve spatial and time correlations, as well as the use of administrative data in order to improve models' and estimations' quality.

10. The development of a method of gross domestic product (GDP) and gross value added (GVA) decomposition in the analysis of regional differences structure was another experimental study. Its goal was to enable dynamic analyses and comparison of territorial units, taking into account GDP per capita, as well as GVA per one employee, their structure, and GVA factors per one employee. Currently, a new tool is under development, which will make the research results available online for any interested user.

11. Additionally, firm-level data collected by official statistics has proved indispensable in the evaluation of the EU-funded interventions. Hence, Statistics Poland has been increasingly involved in counterfactual analyses, however, limiting its activities to carrying out operations with the use of individual-level data and providing outputs, while restraining from the interpretation of the outcomes.

C. Upgrading and updating measurement methods

12. While experimental statistics are usually synonymous to a complex research, novel in terms of the topic, level of data aggregation, methodology, etc., Statistics Poland also endeavors to identify the areas within 'traditional' statistics which require enhancing their measurement techniques in order to improve measurement precision, and/or provide a more complex picture of a given phenomenon. These undertakings are triggered on the one hand, by the changes of certain characteristics of the phenomenon analyzed or its external conditions, or on the other hand, by the recognition of possibilities to apply new data sources or measurement methods, usually deriving from technological advancements in data collection and processing. For instance, dynamic transformations of the retail market, accompanied by changes of purchasing patterns have inspired a design of a novel systems to measure the changes in retail prices, based on big data tools. Access to digital

[1] http://strateg.stat.gov.pl/

technologies related to big data has resulted in a project aiming at modernization of transport statistics production system, which will lay the groundwork for functional analyses of transportation systems and formulation of modern transportation policies. Discerning the potential of satellite data, combined with the recognition of the limitations of traditional agriculture statistics have been translated into a project which aims to build a modern crops identification and a monitoring system.

13. The above-mentioned undertakings point at a shift from traditional, questionnaire-based surveys to research based on alternative data sources or a combination of the two. They also assume pilot implementation of new data production systems, developed in cooperation with research institutes and external stakeholders.

III. Challenges and opportunities

14. The discussion on official statistics' stance on broadening its scope should be pursued at two levels – narrower, operational level, and in a wider context of official statistics' role in contemporary decision-making processes. Opening the debate with the latter appears central to a subsequent definition of challenges and opportunities at the operational level.

15. As long as official statistics assumes its active role in providing fundamental data for evidence-based decision-making at all stages of a policy process, the question on whether to extend scope of its research beyond traditional surveys becomes obsolete. Supporting policy formulation, implementation and monitoring with independent and methodologically rigorous data is a key element of evidence-based policy-making.

16. Official statistics' active role in the above-mentioned processes might, however, impose a substantial challenge on national statistical offices' functioning, and reformulation of their approach to data production. First of all, it may require understanding and participation in a broader context of policy processes and openness to establishing multi-level cooperation with these processes' key players, i.e. statistical data users. Secondly, once the ground for shaping these interactive processes in a systematic framework is established, the design and implementation of information gaps identification system should take place, enabling repetitive and standardized actions to identify information gaps, as well as operationalize the means to cover them.

17. At this point there arise both, organizational and financial challenges for statistical offices, as building a system does not automatically bring in the resources necessary for its operation. Hence, a pro-active attitude of official statistics is necessary to seek the opportunities to fund new research.

18. Furthermore, the consent upon broadening official statistics' scope by *inter alia* experimental research, entails a palpable challenge to ensure independence, transparency and methodological rigidity of the statistical production. Since experimental statistics have not reached full harmonization and coverage, and their methodology has still been under development, the risk of misinterpretation and misuse is higher comparing to traditional statistics. In addition, the procedure of coping with the experimental status of the research should also be in place to allow for either their incorporation into regular statistical production or, in an alternative scenario, drawing lessons from- and considering utilization of some of the aspects of the work carried out.

19. Whereas construction of a system to identify information gaps within official statistics involves an array of challenges on conceptual, organizational, as well as managerial grounds, it concurrently brings opportunities. The most significant of them is that Most promising of them are a chance to actively participate in evidence-based

decision-making, thus, in many cases re-define the role of official statistics and raise its contribution to more effective public management. In addition, it is of value to statistical offices themselves, transforming them into modern, learning organizations, capable to swiftly adjust their operations to actual needs of data users.

IV. Conclusions and recommendations

20. Statistics Poland's experience in pursuing institutionalized and systematic cooperation with data users proved effective in identifying information gaps and creating statistical products that correspond with clearly defined information needs.

21. Concurrently, involving experimental research as a key element of the process has demonstrated that it is one of the most effective means to study new topics. It allows for an empirical check of the adopted research assumptions, as well as, the introduction of necessary changes and corrections in the survey methodology before the launch of permanent research within statutory activities of official statistics.

22. Moreover, despite the fact that in a fair number of the experimental research undertaken, their results are consistent with the assumed goals, the lessons learned from the projects that have not generated expected results are of particular importance. The projects which have not proved successful may result in a decision as to the reformulation of the research concept, methodology, selection of the data sources in terms of their adequacy or quality, thus, pursuing significantly improved research projects. Hence, a careful analysis of the experimental research process and results plays vital role in official statistics' learning processes and constitutes basis for advancement and excellence.

23. The identification of new information needs might take many forms, from an *ad hoc* activity, to a comprehensive and systematic approach based on carefully planned mechanisms within the statistical office. It can develop into an incremental process, proceed from random instances, as well as a top-down decision of official statistics authorities. Regardless of its evolution pattern, the debate on official statistics' broadening its traditional scope should take place in a context of its role in evidence-based policy making.

24. However, if official statistics' active reaction to new information gaps is to be taken for granted, which in consequence translates into increasing engagement in experimental research, and developing novel solution in statistical data production, a significant emphasis of the discussion should be put on ensuring high quality, transparency and independence of new statistical products.